

Rock Island Arsenal
Rock Island
Rock Island County
Illinois

HABS No. ILL 1001

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ILL,
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PHOTOGRAPHS
WRITTEN HISTORIC AND DESCRIPTIVE DATA
District I of Illinois

Historic American Buildings Survey

Prepared at Washington Office

HAER
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HISTORIC AMERICAN ENGINEERING RECORD

ROCK ISLAND ARSENAL
HAER No. IL-20

Location: Rock Island Arsenal,
Rock Island,
Rock Island County, Illinois
UTM: 15.705120.4599030
Quad: Davenport East

Date of Construction: 1863-Present

Present Owner and Occupant: U.S. Army

Present Use: Design, development, and manufacture of
artillery carriages, recoil mechanisms, and
other ordnance items

Significance: Rock Island Arsenal is one of only two "old-
line," nineteenth-century arsenals still in
operation for munitions production. Established
in 1862 as a military storage and repair depot,
the arsenal was designated an ordnance
manufacturing facility two years later. For the
next thirty years, it produced very little
ordnance, concentrating instead on completing
its own construction program. In 1895, the
arsenal began the manufacture of artillery
carriages, which has remained its chief area of
specialization to the present time. Since the
Korean War, the arsenal has also become a
production center for a variety of high-
priority, small-lot ordnance items that private
industry cannot economically manufacture.
Because of its cohesive architectural styling
and tremendous contribution to American ordnance
development and manufacture, Rock Island Arsenal
was designated a National Register Historic
District in 1969.

Historian: Jeffrey A. Hess, February 1985

SITE SELECTION AND FORMER LAND USE

About halfway between St. Paul and St. Louis, the Mississippi River alters its customary north-south course and flows westward past the "Quad Cities" of Moline and Rock Island, Illinois, and Bettendorf and Davenport, Iowa. At this point, the river divides into two main channels around a footprint of land known as Rock Island. Containing almost 900 acres above the high-water mark, the island measures about two-and-three-quarters miles in length from east-to-west, and varies in width from one-quarter to three-quarters of a mile.¹

Although the United States acquired title to Rock Island in 1804 through a treaty with the Sauk and Fox Indians, the government did not formally take possession of the property until the spring of 1816, when the Army constructed a small outpost on the extreme northwest end of the island. Designated Fort Armstrong in honor of former Secretary of War John Armstrong, the installation was responsible for overseeing trade activities and treaty obligations with the Sauk and Fox. According to the 1804 treaty, the Indians ceded about fifty million acres of land in the present states of Illinois, Missouri, and Wisconsin, with the understanding that they would be permitted to inhabit the area until it was officially surveyed and sold to settlers.³ Although the presence of Fort Armstrong should have discouraged unlawful white settlement in the region, it in fact served as a beacon for squatters who, during the late 1820s, invaded tribal territory in the vicinity of Rock Island. In 1832, the Sauk, under the leadership of Chief Black Hawk, attempted to regain their lands and were defeated in a six-month campaign known as the Black Hawk War. During the conflict, Fort Armstrong served as the center of government military operations and provided sanctuary for white settlers. At the conclusion of hostilities, the Sauk, and all other Indian tribes in Illinois, were relocated to unsettled areas west of the Mississippi River.⁴

After the removal of the Indian population, the Rock Island area was quickly platted and settled: the City of Rock Island (originally called Stephenson) was incorporated in 1835 and the City of Davenport in 1836.⁵ Since troops were no longer needed to superintend Indian affairs, the War Department decommissioned Fort Armstrong in 1836, but retained the entire island as a government reserve.⁶ For the next twenty-five years, Rock Island was the subject of considerable controversy between the War Department, which refused to relinquish ownership of the site, and the local citizenry, who were determined to exploit the island's natural resources. Despite government objections, private parties constructed a variety of structures on the island during the 1840s and 1850s, including a dam to the Illinois shore, two water-power sawmills, a sash and blind factory, several residences, and a railroad bridge connecting the cities of Davenport and Rock Island.⁷

Private encroachment on Rock Island was successful at least partly because the government had no clear priorities for the site. Although the Army reoccupied Fort Armstrong as a supply depot from 1840 to 1845, it was not until the mid-1850s, when Congress was considering the sale of the island, that the War

Department presented a long-range plan for the property.⁸ This plan, outlined by Secretary of War Jefferson Davis in a letter to the United States Senate in 1854, called for the construction of a public ordnance works on Rock Island:

I have the honor to acknowledge the receipt of your letter. . . asking the views of this Department as to the expediency of selling the military reservation at Fort Armstrong, on Rock Island, Illinois as contemplated by Senate bill No. 195. The water power available at that place, and the communication by water and by railroads projected or in course of construction, concur with other circumstances in rendering Rock Island one of the most advantageous sites in the whole western country for an armory or an arsenal of construction for the manufacture of wagons, clothing, or other military supplies. . . . Any act that may pass to authorize the sale of [the island] should, I think, leave to the [War] Department full power to retain whatever of the reservation may be found useful and proper for the contemplated works, for which it is hoped that Congress will at some future day make the necessary appropriation.

Ironically, Congress did not appropriate funds for Rock Island until after Davis had become President of the Confederate States of America and the Union Army had experienced heavy losses at the hands of its former Secretary of War. A particularly severe blow was the destruction of the government's small arms works at Harpers Ferry in Virginia by Confederate forces in 1861. Favorably impressed by Rock Island's waterpower potential and security from enemy attack, the War Department recommended the site as a replacement for the Harpers Ferry Armory, but sectional rivalries in Congress initially stymied the selection of a new location for a large manufacturing arsenal. As a compromise measure, Congress in July 1862 authorized the establishment of three smaller storage and repair arsenals to be located "at Columbus, in the State of Ohio, at Indianapolis, in the State of Indiana, and on Rock Island, in the State of Illinois."¹⁰ In the spring of 1864, this act was supplemented by additional legislation expanding RIA's role to include the manufacture of ordnance. At the same time, Congress instructed the War Department to settle all private claims against the island and to take full possession of the property and its waterpower rights.¹¹ As the Civil War drew to a close, RIA "finally possessed the potential to succeed the Harpers Ferry Armory as a major manufacturing establishment."¹²

At the present time, RIA contains only one structure antedating the establishment of the arsenal. This building, known as the Davenport House (see HABS No. IL-158), was originally constructed in 1833 by George Davenport, who had come to Rock Island in 1816 as sutler for Fort Armstrong. Resigning his post with the Army in 1817, Davenport prospered as an Indian trader, served as a colonel in the militia during the Black Hawk War, and helped found the neighboring city in Iowa that still bears his name.¹³ "Out of recognition to his services to the Government," Davenport was permitted to build a residence on the northwest shore of Rock Island and his title to the property was confirmed

by a special act of Congress in 1844, a year before his death.¹⁴ The earliest known illustrations of the Davenport House, dated 1857, show a well-maintained, two-story, Greek Revival structure with a pedimented portico on the north elevation, and wings on the east, west, and south elevations.

After the establishment of RIA, the government purchased the Davenport House from Davenport's heirs and temporarily used it as an office and storehouse. By the turn of the century, the building had fallen into disuse and ramshackle decay. In 1906, under the auspices of the Rock Island County Old Settlers' Association, the Davenport House was repaired and remodeled to its present configuration, which approximates the central two-story section of the building depicted in the 1857 illustration.¹⁶ The building is currently administered as a museum by the Colonel Davenport Historical Foundation.

INITIAL DEVELOPMENT, 1862-1897

In July 1863 the War Department instructed Major C. P. Kingsbury to relinquish his position as inspector of ordnance at Fort Pitt Foundry in Pennsylvania and assume command of RIA. Kingsbury's orders contained detailed information on constructing the new arsenal:

The first building to be erected is the principal storehouse, the plan and details of which are shown by the accompanying drawings (six sheets) which are sent for your information and government. . . . Also enclosed, for the same purpose, are copies of the report [concerning] the location of the buildings. . . . The stone selected and preferred for the buildings is the limestone from the quarries at LeClaire, Iowa, a specimen of which will be sent to you at Davenport. Drawings of the other buildings for the arsenal, and a plan showing their relative positions, will be sent to you hereafter.¹⁷

When Kingsbury arrived at RIA in August, he found the island bustling with construction crews for an entirely different project. The previous month the War Department had selected Rock Island as the site of a prison camp for captured Confederate soldiers. Situated on the north-central shore of the island, the camp was designed for more than 10,000 men who were housed in eighty-four wooden barracks surrounded by a stockade. By the end of 1863, construction was far enough along for the camp to accommodate 6,000 prisoners. After the Civil War, all of the prison structures were eventually demolished. The sole reminder of the camp's existence is a cemetery near the south-central shore of the island for the Confederate soldiers who died during their internment.¹⁸

In contrast to the prison camp, construction work on the arsenal moved at a much slower pace. Kingsbury's instructions called for the immediate erection of a large storehouse with a clock tower on the extreme western end of the island. Although Kingsbury broke ground for this structure on schedule in the fall of 1863, the project was soon beset by difficulties with defaulting con-

tractors and delays in the shipment of building materials. In June 1865, "after two years of frustration, delays, and suspicions," Kingsbury asked to be relieved of his duties at RIA, and the building was finally completed in 1867, under the arsenal's next commandant, Brevet Brigadier General Thomas Jefferson Rodman. Although the storehouse, commonly referred to as the Clock Tower Building, is still standing, it is no longer within the arsenal's boundaries. In 1941, the structure, along with seven acres of land, was placed under the jurisdiction of the Rock Island District Corps of Engineers, which currently uses the site for its headquarters.¹⁹

At the time of Kingsbury's departure, RIA had been redesignated a manufacturing arsenal, but there were as yet no firm plans for transforming the storage depot into a full-scale industrial complex. This task fell to General Rodman, who was admirably suited for the undertaking. A graduate of West Point, Rodman "was impressed early in his career with the need for new concepts in the field of metals and gun-making." During the 1840s and 1850s, he developed a techniques for hollow casting cannon and for producing perforated propellant, which revolutionized the manufacture and use of artillery. As commanding officer of Watertown Arsenal in Massachusetts during the Civil War, Rodman also demonstrated considerable skill in architecture,²⁰ designing and overseeing the construction of an industrial shop complex. According to one contemporary observer, "No better evidence could be desired that the Ordnance Department intended to construct a great armory and arsenal at Rock Island than the fact that an officer of such high standing as General Rodman. . . was selected for the command."²¹

Rodman arrived at RIA in August 1865 and spent six months preparing a construction proposal, which was approved by Washington the next spring. In a recent study of RIA, historian Robert Bouilly outlines the basic features of Rodman's plan:

Rodman designed a manufacturing complex of 10 large shops in the middle of the island rather than at the western end as the previous plans [for the storage depot] had called for. The shop complex in the middle of the island allowed for expansion of the shops and placed them within reach of a dam designed to provide waterpower. These 10 shops and the dam became the core of the arsenal. They still stand today. The shops face each other in two rows [along a main east-west thoroughfare now known as Rodman Avenue]. The northern five shops [Shop B, see HAER No. IL-20A; Shop D, see HAER No. IL-20B; Shop F, see HAER No. IL-20C; Shop H, see IL-20D; Shop K, see HAER IL-20E] were designated for use as an armory [i.e., a small arms manufacturing plant]; the southern shops [Shop A, see HAER No. IL-20F; Shop C, see HAER No. IL-20G; Shop E, see HAER No. IL-20H; Shop G, see HAER No. IL-20I; Shop I, see HAER No. IL-20J] as an arsenal [i.e., a general ordnance manufacturing complex]. The middle shop in each row [Shop E, see HAER No. IL-20H; Shop F, see HAER No. IL-20C] is one story and the rest are three stories tall. All have the same "U"

shaped floor plan with 300-foot by 60-foot wings jutting back from a 210-foot by 60-foot base. . . . Each covers more than an acre, and all are alike with their limestone facades of pillowed blocks. They are the core of a national historic site and constitute one of the largest single American construction projects in the last half of the 19th century. The other buildings and structures from the original plan match the core shops in design and grandeur. The limestone quarters for the commanding officer [see HABS No. IL-1001E] has more than 19,000 square feet of floor space, which makes it²² second in size only to the White House as a government residence.

In his recommendations for RIA, Rodman took careful note of the arsenal's transportation requirements. He envisioned "an internal system of railways [that] would connect all parts of the establishment when any large quantity of material will have to be transported, and this system of roads should connect with the Chicago and Rock Island Road, which crosses the island [about three-quarters of a mile east of its western end]."²³ The existing rail facility included two bridges, one on the north shore to Davenport, Iowa, and the other on the south shore to Rock Island, Illinois; completed in 1856 and partially rebuilt in 1865, the²⁴ bridges were the country's first rail crossing of the Mississippi River. Rodman argued that the system needed to be replaced:

The present location of this [railroad] upon the island is not a suitable one. It cuts the island into two very inconvenient parts, admitting of access from one part to the other only by passing under it on one side of the island and over it on the other, where the wagon road now crosses, and being too high to switch from conveniently at any point except at this crossing. It is, therefore, proposed and recommended that this road be removed to the [western] extremity of the island, where²⁵ the grade is high enough to admit of switching from it at any point.

Concurring in Rodman's analysis, the War Department gained Congressional approval for legislation in 1866 and 1867, which stipulated that the railroad company would be granted a free right-of-way across the island on condition that it bear the full expense of building a new bridge on the south shore and assume half the cost of the superstructure for a new bridge on the north shore. The new rail line was completed across the western end of the island in 1872.²⁶ The old bridges were demolished, and at present the only remnant of the original system is a fragment of a stone pier (Facility 347) which was moved from its original location to a neighboring site on the north²⁷ shore during the construction of Dams and Locks No. 15 in the early 1930s.

The 1872 bridge system lasted only about as long as its predecessor. Within twenty years, it created a serious bottleneck in traffic "[due] to the fact that it was a single track bridge in the middle of an important stretch of main line railroad that had been double tracked."²⁸ In 1895, Congress appropriated funds to remodel the bridge over the north channel with a new double-deck superstructure that would accommodate rail traffic on the upper

level and streetcar, highway, and pedestrian traffic on the lower level. Once again the railroad company, which had been reorganized as the Chicago, Rock Island, and Pacific Railway, agreed to share a portion of the expense. Construction began in the fall of 1895 and was completed in December 1896.²⁹ The new Rock Island Bridge (Facility 320, see HAER No. IL-20P) was the "first important bridge commission" of Chicago engineer Ralph Modjeski, who subsequently established a reputation as one of the country's foremost bridge designers.³⁰ Retaining, but widening, the original stone piers, Modjeski designed the new pin-connected superstructure with five central, double-deck Baltimore through trusses, two single-deck end spans of the Pratt truss variety, and a camelback swing span surmounted by a control house. The swing span, which revolved on center by means of an electric-powered, chain-and-sprocket system, was capable of a complete revolution in either direction "for the purpose of avoiding or taking advantage of unequal wind pressures on the ends of the draw[,] the situation³² of the bridge [being] such that these unequal wind pressures were frequent."

The first building at RIA completed under Rodman's plan was a cylindrical, limestone Reservoir (Building 53, see HAER No. IL-20M) in 1869. Situated a block north of Main Avenue (later renamed Rodman Avenue), the utilitarian structure measured 80 feet in diameter and stood 25 feet above ground. Its height was intended to "give head enough to carry water into [the] second³³ story of shops and all other buildings now contemplated to be built here." At the time of Rodman's death in June 1871, three more buildings were nearing completion: Shop B (Building 60, see HAER No. IL-20A), Shop C (Building 104, see HAER No. IL-20G), and the Commanding Officer's Quarters (Building 301, see HABS No. IL-1001E). All were constructed of limestone quarried near Joliet and Lamont, Illinois.³⁴ In their stonework and general design, these structures served as architectural models for most other major facilities constructed at RIA during the remainder of the nineteenth century. The Greek Revival detailing of Shops B (Building 60, see HAER No. IL-20A) and C (Building 104, see HAER No. IL-20G), accented by classical pilasters, architraves, and pedimented gable ends, was mirrored by subsequent industrial and administrative buildings. Similarly, the Italian villa style of the Commanding Officer's Quarters (Building 301) was later reflected, although on a less grandiose scale, by the Italianate detailing of three Subalterns Officers' Quarters (Building 2, see HABS No. IL-1001F; Building 3, see HABS No. IL-1001G; Building 4, see HABS No. IL-1001H).³⁵

After Rodman's death, the construction of RIA became the responsibility of Colonel Daniel Webster Flager, who served as commandant from 1871 to 1886. Flager pushed the work forward as quickly as the government's appropriations policy would allow. As Bouilly explains in his history of RIA:

Flagler vigorously constructed the buildings and promoted their use. He did so in the face of peculiar labor and funding constraints. Congress in those days stipulated that all appropriations had to be spent in the fiscal year they were appropriated for. Money could not be carried over

from year to year. This led to a curious construction cycle. Appropriations would be approved by Congress some time in March or April for the fiscal year beginning in July. There would be a massive hiring of stonecutters and laborers in midsummer and frantic activity on the buildings until just before Christmas when virtually all the men would get laid off until the next summer when the infusion of money for the next fiscal year would trigger a repeat of the cycle.³⁶

Following Rodman's master plan, Flagler built a Boiler House (Building 105, see HAER No. IL-20K) for Shop C in 1872, a Storehouse (which was destroyed by fire in 1903 and rebuilt in brick as Building 131 in 1905; see HAER No. IL-20BB) for Shop A in 1885, and seven manufacturing buildings on Rodman Avenue: Shops A and D in 1876, Shop E in 1874, Shop F in 1878, Shop G in 1882, Shop H in 1886, and Shop I in 1883 (Buildings 102, 62, 106, 64, 108, 66, 110; see HAER Nos. IL-20F, IL-20B, IL-20H, IL-20C, IL-20I, IL-20D, IL-20J). Around this core of manufacturing facilities, he added a Magazine (Building 280, see HAER No. IL-20A) and Barracks (Building 90, see HABS No. IL-1001A) in 1873, a Post Building (Building 225, see HABS No. IL-1001B) combining fire station, guard house, and storehouse in 1874, a small Guard House (Building 321, see HABS No. IL-1001D) in 1875, and a Lumber Shed (Building 138, see HAER No. IL-20N) in 1886.

According to Rodman's plan, the north-central shore of the island was set aside as a residential area, and it was here that Rodman had built the Commanding Officer's Quarters (Building 301, see HABS No. IL-1001E). To the east of this imposing structure, Flagler in 1872-1874 constructed three Subaltern Officers' Quarters (Buildings 2, 3, 4; see HABS Nos. IL-1001F, IL-1001G, IL-1001H), which, in 1881, he linked to the central manufacturing area by means of a new roadway.³⁷ Because the road crossed "low ground and standing water," it was named Lake Avenue and included a double-arched stone bridge (Facility 57), ornamented with gargoyles. Flagler justified this seeming extravagance by explaining that the arches "were constructed cheaply of rough stone. . . and owing to their prominence in the arsenal grounds, some care was taken to make them sightly and ornamental."³⁸

After Flagler's departure, RIA was commanded in rapid succession by Colonel Thomas G. Baylor (1886-1888), Colonel James M. Whitmore (1888-1891), and Colonel Adelbert R. Buffington (1892-1897). During the tenure of these officers, the last stone buildings exemplifying Rodman's Greek revival design were completed: in 1889, a Headquarters (Building 360, see HABS No. IL-1001C), and in 1893, Shop K (Building 68, see HAER No. IL-20E) and a Storehouse for Shop K (Building 56, see HAER No. IL-20L).³⁹ The completion of Shop K, under construction for seven years, was particularly significant in that it fulfilled the original plan for ten great Stone Shops on Rodman Avenue.

When the construction of the industrial buildings at RIA first began, the War Department announced that "it seems manifest that Congress intended that this

arsenal should be made the great arsenal of deposit and construction [i.e., manufacturing] for the Mississippi Valley, and. . . it was planned with that end in view."⁴⁰ Despite this declaration, RIA played only a minor role in ordnance manufacturing during the nineteenth century. Most of the great Stone Shops on Rodman Avenue stood empty, or were used for miscellaneous storage. During the 1870s and 1880s, the few buildings that were equipped with industrial machinery were, by and large, used for manufacturing construction materials for the arsenal's own buildings. Again to quote Bouilly:

Much of the manufacturing effort at the arsenal before the Spanish-American War concentrated on construction of the buildings. The rolling mill [Shop F, Building 64, see HAER No. IL-20C] produced most of the roof trusses and machinery shafting from 1878 to 1900. The foundry [Shop E, Building 106, see HAER No. IL-20H] and machine shop [Shop C, Building 104, see HAER No. IL-20G] made much of the machinery and building hardware such as the locks and stairways. The carpenter shop [Shop C] made the window frames. Contract labor did some of the work while civilian employees and soldiers did other portions of the job. . . . Manufacturing [of ordnance] began slowly, in July 1875. In May the chief of ordnance, Stephen V. Benet, had visited Rock Island. Soon thereafter he gave Major Flagler the go-ahead to begin the manufacture of infantry and cavalry equipment[,] which took place in a tin shop and harness shop in Shop C]. . . .⁴¹ Four years later. . . 280 men were employed on the island and in the shops.

Additional responsibilities for RIA came in the 1890s as a result of a reorganization in the Army's manufacturing program. During the 1880s, the Ordnance Department had designated Watervliet Arsenal near Albany, New York, as the site of a new gun tube factory for heavy-caliber seacoast defense cannon. The gun carriages for the new ordnance were to be produced by Watertown Arsenal near Boston, which specialized in this line of work. Watertown, however, was unable to handle both the new assignment and its old production schedules. To expedite work on the heavy carriages, the Army selected RIA to manufacture some of the lighter carriages formerly produced at Watertown. In 1894, the Machine Shop (Shop C, see HAER No. IL-20G) at RIA completed its first gun carriage. Total output, however, was⁴² limited, and never exceeded more than 50 carriages a year before World War I.

SPANISH-AMERICAN WAR

The Spanish-American War brought a tremendous spurt of activity to RIA. Employment increased sixfold to almost 3,000 workers, and the arsenal turned out over five million pounds of stores, including forks, spoons, bridles, carbine scabbards, saddles, lariats, and sabre straps.⁴³ Although production quickly declined after the conclusion of the conflict, the Army made long-range plans to increase RIA's manufacturing capabilities. The war had revealed major defects in the Army's standard-issue Krag-Jorgensen rifle,

which had been manufactured at Springfield Armory in Massachusetts. To get a new weapon into production as quickly as possible, Congress in 1899 appropriated funds to equip the almost-empty armory shops at RIA with small-arms machinery. By 1903, the Army had selected a new make of Springfield rifle as a replacement for the Krag-Jorgenson, and the small arms plant at RIA began production in December 1904. Over the next ten years, RIA assembled more than 200,000 model 1903 Springfield rifles.⁴⁴ The production equipment used in this operation no longer survives at the arsenal.

The establishment of the small arms plant at RIA necessitated the construction of a new power system. Since the mid-1870s, the arsenal's shops had relied on a combination of steam and waterpower. Steam power was furnished by a Corliss engine in Shop C (see HAER No. IL-20G) and a shop-built engine in Shop F (see HAER No. IL-20C). Waterpower derived from a dam-and-turbine installation on the south-central shore of the island, which energized the shops by means of wire-rope drives connected to a power take-off shaft.⁴⁵ Despite improvements to the dam and the construction of a frame powerhouse in 1892, the arsenal's waterpower proved inadequate for the expanded manufacturing program of the Spanish-American War. When the powerhouse burned in 1899, the Army decided to replace the entire system with a hydroelectric facility capable of powering the newly proposed small arms plant. Completed in 1901, the Hydroelectric Plant (Building 160, see HAER No. IL-20CC) was a one-story, brick building containing fourteen Samson-Leffel type turbines shaft-connected by bevel gears to two three-phased, alternating-current, revolving-field generators. The building was expanded two years later with a matching brick addition for six similar turbines and one generator.⁴⁶ None of this original generating equipment survives at the arsenal.

WORLD WAR I

The United States entered World War I on April 16, 1917. Within ten weeks, the work force at RIA more than doubled to 4,786 employees. The peak month for wartime employment⁴⁷ was June 1918, when more than 10,000 workers were on the arsenal's payroll. During World War I, almost all of the manufacturing at RIA took place in the ten Stone Shops on Rodman Avenue, which, for the first time, were fully equipped with machinery. Production items included artillery harnesses, mess kits, haversacks, model 1903 Springfield rifles, and a variety of gun carriages.⁴⁸ To facilitate material handling in the manufacturing area, the Ordnance Department in 1917 commissioned Stone and Webster Company of Boston to design and build connecting links between Buildings 60 and 62 (Building 61, see HAER No. IL-20Q), 66 and 68 (Building 67, see HAER No. IL-20R), 102 and 104 (Building 103, see HAER No. IL-20S), and 108 and 110 (Building 109, see HAER No. IL-20T). Completed in 1918, the four connecting links were two-story, reinforced-concrete structures with full basement and stone-veneer walls that matched the color, texture,⁴⁹ and classical detailing of the original arsenal shops (see HAER No. IL-20-1).

In the spring of 1917, the Ordnance Department considered the possibility of designing other new buildings at RIA in the classical style of the nineteenth-century Stone Shops. But the idea was soon rejected as impractical. One of the first projects to come up for consideration was a loading plant for 155mm artillery shells. RIA's commandant, Colonel George W. Burr, explained the problems of adapting the arsenal's prevailing architectural style to such a facility:

The architects tells me that it is extremely difficult to follow the existing building types of the Arsenal in modern buildings in which three-quarters of the wall surface is given over to window space. This construction is necessary in the [artillery ammunition loading] plant because of the lighting requirements and it is also most desirable in a plant handling explosives in order that the force of a minor explosion⁵⁰ may blow out the windows without damage to the walls of the structure.

The architectural firm in charge of the project was Westinghouse-Church-Kerr Company of New York. In April 1917, it presented Burr with a choice of two designs. The commandant made his selection and requested confirmation from his superiors in Washington:

The design with the gable roof is an attempt to harmonize the roof details with the existing Arsenal buildings. I am not impressed with this design because of the mixture of hip and gable roofs and the difficulty of pleasingly treating the roof structure in a single building with varying heights of roof. The other [design is] with flat roof and with the facade of a semi-castellated type with loop holes. This design I consider a very good one but I would like to have the approval of the Chief⁵¹ of Ordnance on it before the work on the plans is carried too far.

Washington approved the Gothic revival, castellated design, and the Artillery Ammunition Loading Plant (Building 250, see HAER No. IL-20U) was completed in February 1918. During the remaining nine months of the war, the plant loaded approximately 167,000 155mm howitzer shells.⁵² Located about two blocks southwest of the Stone Shops on Rodman Avenue, the building was a reinforced-concrete structure with large, regularly spaced blocks of industrial steel sash. Of rectangular plan, it measured 360 feet by 400 feet, with a three-story section on the north, a two-story section on the east, and a one-story section on the west. In varying degrees, the plant's Gothic revival detailing was also adopted for several smaller, neighboring structures, designed by Westinghouse-Church-Kerr and completed in 1917-1918.⁵³ These comprised two Dry Kilns (Buildings 139, 140; see HAER Nos. IL-20W, IL-20X), an Incinerator Building (Building 133, see HAER No. IL-20Y), and a TNT Building (Building 251, see HAER No. IL-20V).

The other manufacturing facilities constructed at RIA during World War I were utilitarian-industrial in design with only minimal architectural detailing.

The largest was a four-story, reinforced-concrete Field and Siege Building (Building 220, see HAER No. IL-20AA), measuring about 120 feet by 600 feet, with four wings extending from its south facade. Situated on Rodman Avenue one block west of the Stone Shops, the building was designed by Stone and Webster and completed in the summer of 1918.⁵⁴ Two steel-framed Machine Shops (Buildings 230, 240) and a four-story, reinforced-concrete, Recuperator Plant (Building 210, see HAER No. IL-20Z), all designed by Ordnance Department personnel, were not completed until 1920-21.⁵⁵ The RIA Recuperator Plant (a recuperator is the mechanism that regulates the return of an artillery gun from recoil position to firing position) was tooled to manufacture Puteaux recuperators, which were of French design.⁵⁶ It began experimental production in 1920; none of the original manufacturing equipment survives at RIA.

The expansion of RIA's industrial plant necessitated a major upgrading of maintenance, storage, and utilities facilities. In the summer of 1918, a new reinforced-concrete Central Steam Heating Plant (Building 227), designed by Stone and Webster, began service, and a year later, a brick addition to the arsenal's Hydroelectric Plant (Building 160, see HAER No. IL-20CC) went on line. Designed by Central Engineering Company of Davenport, Iowa, the hydro addition contained eight vertical, Francis-type turbines direct-connected to eight, three-phase, 60-cycle generators, each with a capacity rating of 430 kilovolts.⁵⁷ This machinery is still in service at the arsenal.

During the period between the two world wars, manufacturing operations at RIA were drastically curtailed, and the arsenal became "scarcely more than a storehouse of materiel left over from the First World War."⁵⁸ In 1925, the installation's commandant Colonel D. M. King reported that "practically no productive work is now being carried on, [our] operations being confined principally to work of an experimental nature in connection with the design of artillery materiel and repair of equipment turned in from the field. The percentage at which [our] facilities are now being utilized may be stated as approximately five to ten percent."⁵⁹ Experimental work during this period included limited production of tanks, development of the 3-inch anti-aircraft gun mount, and improvement of artillery recoil mechanisms. For a time, machining operations centered in Building 250 (see HAER No. IL-20U), which was cleared of ammunition loading equipment. But after 1933, "almost all manufacturing activities . . . were concentrated in the large Shop M [Building 220, see HAER No. IL-20AA], leaving most shops . . . inactive."⁶⁰

WORLD WAR II

During World War II, RIA acquired several new facilities, all designed by Ordnance Department staff. The speed and economy of their construction was reflected in their unadorned utilitarian-industrial architecture. The most notable exception was the new, four-story, reinforced-concrete Headquarters (Building 390), which was ornamented at the main entrance by "tall, massive, stepped-back pilasters" reminiscent of late WPA federal buildings. The

structure was completed in 1942 by Priester Construction Company of Davenport, Iowa.⁶¹ The largest single construction project was the erection of Building 299, a one-story, steel-framed, reinforced-concrete warehouse covering almost 18 acres. At the time of its completion in 1942 by Permanent Construction Company of Chicago, the structure was "one of the largest storage buildings in the world."⁶² An adjacent Steam Heating Plant (Building 168) was constructed for the warehouse in 1944. Other major new facilities, all of reinforced-concrete construction, included a Forge Shop (Building 222) and Storehouse (Building 144) in 1942, and a Laboratory (Building 107) and Assembly Plant (Building 208) in 1943. The wartime shortage of structural steel necessitated the use of laminated wood trusses in the Assembly Plant (Building 208), which was also built by Priester Construction Company.⁶³

At the outbreak of the war, the nation's government-owned arsenals were virtually the only manufacturing establishments in the country with experience in producing military hardware and ammunition. To speed private industry's transition to wartime manufacturing, the arsenals were called upon to provide private contractors with ordnance blueprints and specifications in their various areas of specialization. At RIA, this meant extensive consulting work on the manufacture of artillery vehicles. After this initial phase, RIA continued its advisory role by serving as the country's main research-and-development center⁶⁴ for gun carriages, gun mounts, recoil mechanisms, and rocket launchers. The arsenal also manufactured and reconditioned these items, as well as a variety of small arms, engine parts, and leather products. Manufacturing operations took place in sixteen buildings:

- Shop B: [Building 60] The Engine Overhaul Division, engaged in the overhaul of tank engines and miscellaneous automotive equipment, occupied the east wing of Shop B until April, 1944. A proof-firing range and a cleaning section for small arms were located in the west wing of the basement [see HAER No. IL-20A].
- Shop C: [Building 104] The Woodworking Division, producing all types of crates, boxes, parts for target frames, storage racks and miscellaneous items, occupied the entire west wing and the first floor, east wing, of Shop C. The Cloth and Leather Division, turning out a wide variety of cloth and leather items occupied the second floor, east wing. The front bay of the second floor and the northeast corner of the basement were devoted to the Printing Division, which produced targets and various printed forms [see HAER No. IL-20G].
- Shop D: [Building 62] In April, 1944, the Engine Overhaul Division took over the entire west wing of Shop D. A section for the overhaul and modification of .50 caliber machine guns was

established on the second floor, east wing, in April, 1943. The Tripod Division, engaged in the repair, modification and overhaul of machine gun tripods, mounts and miscellaneous small metal parts, occupied the first floor, east wing [see HAER No. IL-20B].

- Shop E: [Building 106] The Foundry Division, producing all manner of iron, bronze and aluminum castings, was housed in the east wing of Shop E. The Pattern Division, manufacturing patterns for all types of castings, occupied the west wing and front bay of Shop E [see HAER No. IL-20H].
- Shop F: [Building 64] Shop F was partially devoted to the Heat Treating Section, which handled heavy forgings, castings and other large items [see HAER No. IL-20C].
- Shop G: [Building 108] Shop G was devoted to a machine division manufacturing Belleville springs, parts for recoil mechanisms, artillery carriages and experimental projects (see HAER No. IL-20I).
- Shop H: [Building 66] The Small Arms Division, manufacturing metallic belt links and parts for .30 cal[iber] machine guns and overhauling and heat treating small arms material, was located in Shop H [see HAER No. IL-20D].
- Shop I: [Building 110] Shop I was occupied by the Assembly Division which overhauled and assembled various types of artillery carriages and recoil mechanisms [see HAER No. IL-20J].
- Shop K: [Building 68] The Small Arms Division, devoted to the manufacture, assembly and proof firing of .30 cal[iber] machine guns, occupied Shop K [see HAER No. IL-20E].
- Shop L: [Building 250] A machine division for the manufacture of parts for artillery vehicles and miscellaneous equipment was housed in Shop L [see HAER No. IL-20U].
- Shop M: [Building 220] The chief manufacturing shop in the Manufacturing Department, Shop M, produced recoil mechanisms, parts for artillery carriages, automotive vehicles, tools and miscellaneous items [see HAER No. IL-20AA].
- Shop O: [Building 240] The Hydraulic Press Division, located in Shop O, produced forgings and all heavy press work.
- Shop Q: [Building 230] Located in Shop Q, the Welding Division handled all production welding and the fabrication of all weldments.

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- Shop R: Shop R was occupied by a machine division devoted
[Building 210] to the manufacture of various types of ordnance material,
tools and gages [see HAER No. IL-20Z].
- Building 208: A new shop, Building 208 was occupied by an assembly
division for the overhaul and assembly of heavy artillery
carriages, tanks and other automotive vehicles.
- Building 222: Completed in 1942, Building 222 was occupied by the Forge
and Heat Treat Division the same year.⁶⁵

After the surrender of Japan in August 1945, RIA substantially cutback its production and overhaul activities. Employment in the manufacturing and reconditioning sections dropped from over 10,000 to less than 1,500. By 1946, most of the arsenal's shops had been placed in standby condition, which gave the Army the opportunity to modernize the installation's equipment with new motorized machine tools.⁶⁶ For the remainder of the 1940s, RIA was responsible for limited production of machine guns, ammunition loaders for gun mounts, and metal shipping crates; experimental design work for mortars, rocket launchers, recoil mechanisms, and machine guns; and overhaul of artillery, tanks, automotive equipment, and small arms. Manufacturing and experimental design work were consolidated in Shop M (Building 220, see HAER No. IL-20AA); overhaul operations in Building 208.⁶⁷

KOREAN WAR TO PRESENT

Since the Korean War, there has been relatively little major new construction at RIA. Apart from the erection of a one-story, concrete-block Small Arms Assembly Plant (Building 72) in 1954, the arsenal did not significantly expand its manufacturing facilities. Indeed, many of the old Stone Shops were converted to office space after 1954, when RIA became headquarters for the Ordnance Weapons Command, which was in charge of supervising all Army manufacturing installations. There was, however, an expansion of testing facilities on the western end of the island. The largest of these structures was a one-story, concrete-block Simulation and Experimental Firing Center (Building 25), completed in 1972 for test firing machine guns. The arsenal also added to its housing stock in 1972 by building nine two-story, multi-unit, wood-frame residences Buildings 92-100) on the north-central shore of the island.⁶⁸

During the Korean War, the arsenal's principal activities were the development and manufacture of rocket launchers and mortars, and the overhaul and rehabilitation of tanks, artillery, and small arms.⁶⁹ In 1962, most of RIA's rocket launcher work was transferred to Watertown Arsenal, but the installation shortly acquired increased responsibilities for small arms design and production, when Springfield Armory in Massachusetts, the government's previous center for such work, was closed by the Army in 1967.⁷⁰

RIA's activities during the Vietnam War focused on the design and development of aircraft machine gun systems, artillery recoil mechanisms, and gun mounts, as well as the overhaul of small arms, artillery, and combat vehicles.⁷¹ But after the removal of the arsenal's tank rebuild activity in 1972, its manufacturing program increasingly became a custom-order operation for "a great variety of small job lot components or assemblies which private industry [could] not supply at economical prices."⁷² RIA was able to fulfill this function largely because of its high-speed, close-tolerance machining capabilities in Building 220 [see HAER No. IL-20AA]. The arsenal had begun to automate its machining operations in 1959, when it acquired its first two numerically controlled [i.e., tape-programmed] machine tools. By 1968, there were twenty-eight numerically controlled devices in operation, and their number increased to forty-three in 1971. During the early 1970s, RIA also acquired its first computerized machining system, which was capable⁷³ of operating several numerically controlled devices simultaneously. In the aftermath of the Vietnam War, RIA continued its role as a custom-order shop for specialty ordnance items and concentrated its general research, manufacturing, and overhaul operations on artillery recoil mechanisms, gun mounts, and machine gun systems.

NOTES

1. Ira O. Nothstein and Stephens, Clifford W. A History of Rock Island Arsenal from Earliest Times to 1954, vol. 1, ed., Clifford W. Stephens (Rock Island: U.S. Army, Rock Island Arsenal, 1965), p. 24.
2. Nothstein and Stephens, vol. 1, pp. 31-32.
3. "Treaty with the Sauk and Foxes, 1804," Indian Treaties, 1778-1883, ed. Charles J. Kappler (New York: Interland Publishing Inc., 1972), pp. 74-76.
4. Nothstein and Stephens, vol. 1, pp. 45-60.
5. Katherine Seusy, "Rock Island," p. 36; William Roba, "Davenport," p. 67, in Joined by a River: Quad Cities, ed., Frederick I. Anderson (n. pl.: Lee Enterprises, Incorporated, 1982).
6. Nothstein and Stephens, vol. 1, pp. 61-62.
7. The most detailed account of the controversy over public-private ownership and use of the island is found in D. W. Flagler, A History of the Rock Island Arsenal from Its Establishment in 1863 to December, 1876 (Washington, D.C.: Government Printing Office, 1877); see especially pp. 24-27, 48-49, 52-94.

8. On the use of Fort Armstrong as a supply depot during the 1840s, see Nothstein and Stephens, vol. 1, pp. 64-65; Robert Bouilly, "Arsenal Island," Joined by a River, p. 120.
9. Davis' letter is quoted in Flagler, p. 36.
10. On the destruction of the Harpers Ferry Armory and the subsequent political maneuvering leading to the establishment of RIA, see Bouilly, pp. 121-122. The act of 1862 authorizing RIA as a storage and repair arsenal is quoted in Nothstein and Stephens, vol. 1, p. 93.
11. On the passage of the 1864 act authorizing RIA as a manufacturing arsenal, see Nothstein and Stephens, vol. 1, pp. 122-123. The government's adjudication of private claims on Rock Island is fully discussed in Flagler, pp. 127-228.
12. Bouilly, p. 122.
13. For biographical information on Davenport, see Flagler, pp. 15, 25; Nothstein and Stephens, vol. 1, pp. 37-39, 69; Roald Tweet, "Formed by a River," Joined by a River, pp. 23-24; Roba, 66-67; Frank B. Wilkie, Davenport Past and Present (Davenport, 1858), pp. 160-161. The 1833 construction date for the Davenport House is substantiated in MacDonald and Mack Partnership, "Preliminary Report: Colonel George Davenport House," unpublished draft report prepared for Colonel Davenport Historical Foundation," March 31, 1984, Appendix A, RIA Historical Office.
14. Nothstein and Stephens, vol. 1, p. 70.
15. A plot plan and illustration of the Davenport House is recorded on "Map of Upper Rapids of the Mississippi River from Davenport & Rock Island to Le Claire," unpublished, 1857, Rock Island County Historical Society, photographic copy in RIA Historical Office.
16. MacDonald and Mack Partnership, Appendix A; Henry B. Moy and Titus M. Karlowicz, "Resource Inventory and Evaluation of Rock Island Arsenal, Rock Island, Illinois," p. 144, unpublished report prepared for United States Department of the Interior Heritage Conservation and Recreation Service by Midwestern Archeological Research Center, Illinois State University, 1981.
17. Quoted in Nothstein and Stephens, vol. 1, p. 97.
18. On the construction and demolition of the prison camp, see Otis Bryan England, A Short History of the Rock Island Prison Barracks (Rock

- Island, Historical Office, U.S. Army Armament Materiel Readiness Command, 1981), pp. 1-7, 33.
19. A thorough history of the Clock Tower Building is provided by Roald Tweet, The Rock Island Clock Tower, from Ordnance to Engineers (Rock Island District U.S. Army Corps of Engineers, 1977); see pp. 11-15 for a discussion of Kingsbury's difficulties with the project; p. 26 for the building's conveyance to the Corps of Engineers. For the construction date of the Clock Tower Building, see Flagler, pp. 109-110.
 20. The discussion of Rodman's contributions to metallurgy is based on Judy D. Dobbs, A History of the Watertown Arsenal, Watertown, Massachusetts, 1816-1967 (n. pl.: n. pub., 1977), p. 21; David T. Zabecki, "Father of the Rock Island Arsenal," Field Artillery Journal, 49 (January/February, 1981), 55-56. Rodman's architectural work at Watertown Arsenal is discussed in Libby Baylies and Betsy Bahr, "Historic American Buildings Survey of the United States Army Materials and Mechanics Research Center, Watertown, Massachusetts," pp. 37-38, unpublished, 1982, HAER No. MA-20, HABS/HAER Collection, Prints and Photographs Division, Library of Congress.
 21. Flagler, p. 115.
 22. Bouilly, pp. 123-124. All of Rock Island was designated a National Register Historic District in 1969; see Leonard E. Lock, National Register of Historic Places Inventory--Nomination Form for Rock Island Arsenal, unpublished, 1969, RIA Historical Office. In his formal recommendations to Washington, Rodman elaborated on his reasons for choosing a mid-island site for the industrial buildings: "The site selected for the manufacturing part of the establishment is . . . on high ground, which admits of easy and effective drainage, thus giving dry cellars under all the buildings. . . . The greater part of the timber has already been cut from the proposed site, which is another consideration favoring its selection. It is proposed to commence building in the middle of the length of the proposed site, and enlarge each way as the demands of the country may require, leaving the beautiful park of trees at each end until necessity shall require their removal"; as quoted in Flagler, p. 118.
 23. As quoted in Flagler, p. 119.
 24. William Riebe, "The Government Bridge," Rock Island Digest, 2 (1983), 70; Roald Tweet, A History of the Rock Island District Corps of Engineers (Rock Island: U. S. Army Engineer District, Rock Island, 1975), p. 13. The island's north shore bridge was rebuilt on its original piers in 1866; see Riebe, 73.

25. As quoted in Flagler, pp. 119-120.
26. F. E. Robbins, "Copy of History of the Rock Island Bridge," pp. 4-8, unpublished, 1910, RIA Historical Office.
27. Author's interview with Robert Bouilly, Senior Historian, RIA, July 17, 1984. The pier fragment is marked by a historical plaque commemorating the first railroad bridge across the Mississippi River.
28. Riebe, 74.
29. Robbins, pp. 16-18.
30. "Interstate Bridges to Iowa: A Descriptive List of Bridges over the Mississippi, Missouri, Des Moines, and Big Sioux Rivers," unpublished report prepared for Iowa Department of Transportation by Dennett, Muessig & Associates, Ltd., 1982, n.p., Iowa State Historic Preservation Office, Des Moines. For a brief discussion of Modjeski's career up to 1916, see The National Cyclopaedia of American Biography, vol. 15 (New York: James T. White & Company, 1916), pp. 68-69.
31. For descriptions of the Rock Island Bridge, see "Interstate Bridges to Iowa"; "Double-Deck Highway and Railway Bridge Rock Island, Ill." Engineering News, 36 (December 17, 1896), 406-408; "The United States Rock Island Bridge," Engineering Record, 35 (January 30, 1897), 181; "The New United States Rock Island Bridge," Engineering Record, 37 (April 2, 1898), 384-387.
32. "The New United States Rock Island Bridge," 384. According to Dorman Miller, Rock Island Arsenal Bridge Foreman, wind conditions still affect the operation of the bridge. The Rock Island Bridge is aligned approximately due north and south. When wind blows from a quarter direction (ie, northeast, northwest, southeast, southwest), it strikes the bridge obliquely, thereby exerting unequal pressures on the ends of the draw span. During a strong northeast wind, for example, the northern end of the draw span experiences significantly greater wind pressure than the southern end. When river traffic requires the draw to be opened under these conditions, the bridge operator pivots the swing span ninety degrees to the northwest, partially using the wind to "push" the span into an east-west alignment. In the east-west position the draw span experiences greater wind pressure on its eastern end, so the operator closes the draw by pivoting the span ninety degrees to the northeast, once again taking advantage of the wind (Jeffrey A. Hess, interview with Dorman Miller, January 28, 1985). The 1872 bridge was equipped with a unidirectional swing span, which made its operation difficult under certain quarter-wind conditions.

33. Rodman to Ordnance Department, April 14, 1869, as quoted in Flagler, p. 253.
34. Flagler, pp. 269, 256.
35. Baylies and Bahr (pp. 4-10 through 4-12) point out that Rodman used similar Greek revival and Italianate designs for industrial and residential buildings at Watertown Arsenal, and they suggest that "his efforts at Watertown can be seen as early expressions of ideas that were later carried out at Rock Island." The Machine Shop (Building 313) that Rodman constructed at Watertown incorporated a U-shaped plan that was particularly "similar in design to the stone shop buildings later erected at Rock Island."
36. Bouilly, p. 125.
37. Completion dates of the various structures are taken from Flagler, pp. 269-273; Nothstein and Stephens, vol. 1, pp. 156-157.
38. "Report of the Chief of Ordnance," Appendix 10, p. 80, House Documents, vol. 2095 (Washington: Government Printing Office, 1882).
39. Nothstein and Stephens, vol. 1, pp. 176-193.
40. "Report of the Chief of Ordnance," p. 250, House Documents, vol. 1503 (Washington: Government Printing Office, 1871).
41. Bouilly, pp. 125-126. The manufacturing of infantry and cavalry equipment was on an extremely modest scale: "About 1874 the manufacture of tin cans or containers for oils for issue to troops was begun and that work marks the beginning of the tin shop as a manufacturing plant. Between 1874 and 1881 from time to time a few tin cups for issue were made by hand, also parts of meat cans procured elsewhere were tinned and assembled here. April 20, 1882 a power press especially adapted to punching and drawing sheet metal work was procured. This press was used in the manufacture of meat cans, and in other work including tin cans, tin cups and tin containers for stores for issue. In the succeeding years small orders were from time to time given this shop but its work did not increase much in importance until during the fiscal year 1891, when the equipment work, formerly done at Watervliet Arsenal, was transferred to Rock Island Arsenal. Up to 1898 the production of meat cans and tin cups was on a most moderate scale and no canteens had been manufactured, altho a number had been overhauled and repaired. The tin shop plant therefore at that time comprised only one power press and one power shears with several folders and minor

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- tools"; see History of Rock Island Arsenal 1862-1913 (N. pl.: n. pub., n.d.), pp. 9-10, Historical Office, RIA. The same source gives a similar description of the harness shop, pp. 25-29.
42. Bouilly, pp. 126-127. In 1897, the gun carriage operation was moved to Shop G; see History of Rock Island Arsenal, 1862-1913, pp. 17-20.
 43. Nothstein and Stephens, vol. 1, pp. 203-206.
 44. For the events leading to the establishment of the small arms plant and for a general description of the manufacturing operation, see F. A. Stanley, "The United States Arsenal at Rock Island --IV, V, VI, VII," American Machinist (February 23, March 2, 9, 23, 1905), 239-243, 286-291, 311-316, 375-379. On total rifle production at RIA before World War I, see Bouilly, p. 127.
 45. On the use of steam power, see History of Rock Island Arsenal, 1862-1913, p. 73. The most detailed discussion of the wire-rope drive waterpower system is Leonard C. Weston, "Telodynamic Power System," Military Engineer, 58 (November-December 1966), 427-430.
 46. For improvements to the arsenal's waterpower during the 1890s and the construction of the Hydroelectric Plant, see History of Rock Island Arsenal, 1862-1913, pp. 63-77.
 47. Nothstein and Stephens, vol. 2, pp. 248, 249.
 48. Nothstein and Stephens, vol. 2, pp. 258-259.
 49. War's Greatest Workshop Rock Island Arsenal (No. pl.: Arsenal Publishing Company, 1922), pp. 27, 37.
 50. G[eorge] W. Burr to Chief of Ordnance, April 18, 1917, unpublished correspondence, RIA Historical Office.
 51. Burr to Chief of Ordnance, April 18, 1917.
 52. Nothstein and Stephens, vol. 2, p. 259; War's Greatest Workshop, p. 26.
 53. War's Greatest Workshop, pp. 26, 37; RIA Real Property Inventory.
 54. War's Greatest Workshop, pp. 26-27, 37.
 55. RIA Real Property Inventory.
 56. Nothstein and Stephens, vol. 2, pp. 317-318, 327-328.

57. War's Greatest Workshop, pp. 28, 37, 91.
58. Levin H. Campbell, The Industry Ordnance Team (New York & London: Whittlesey House, 1946), p. 40. Campbell, who served as Chief of Ordnance during World War II, had first-hand knowledge of the "lean years" at RIA during the inter-war period (p. 35): "One of the saddest days of my life occurred when I was stationed at Rock Island Arsenal in 1923. We received word from Washington of another slash in Ordnance appropriations and were compelled to make drastic curtailments. We had only two unpleasant alternatives -- to discharge many of our younger civilian employees or to cut the salaries of our veteran workers. If we fired the youngsters, the armament art in America would eventually die out. It therefore became necessary to inform those older men who had rendered loyal and faithful service to their country for many years of our grave dilemma. We talked the matter over with them and they agreed. . .to accept cuts in their yearly salaries ranging up to a thousand dollars. They agreed with us that only in this way would it be possible to maintain continuity in our work and to hand down to the next generation the priceless unwritten lore of armament design and manufacture."
59. D. M. King, "Rock Island Arsenal," Army Ordnance, 5 (January/February 1925), 636.
60. Nothstein and Stephens, vol. 2, pp. 315-355; George Wickstrom, "History of Rock Island Arsenal, Section 1, 1919-1939," pp. 45-48, typescript, Historical Office, RIA.
61. "Architectural Concrete Building Aids Arsenal in Its Fourth War," Concrete, 51 (September 1943), 36; Clifford W. Stephens, A History of Rock Island and Rock Island Arsenal, vol. 3 (U.S. Army, Rock Island Arsenal, 1965), p. 465; "Arsenal Buildings Vital to War Output Were Put Up on Site of Former Woodlands," Rock Island Argus, December 30, 1945.
62. "Rock Island Depot Activity," (Rock Island, 1963), n.p., RIA Historical Office.
63. "Arsenal Buildings Vital to War Output."
64. Campbell, pp. 40-41; Stephens, vol. 3, pp. 401, 414-416, 449-450; Niel M. Johnson, "Twenty Years of Rocket Launcher Work Reviewed by Rock Island Arsenal," pp. 1-3, unpublished, n.d., RIA Historical Office.
65. Stephens, vol. 3, pp. 396-398.
66. Stephens, vol. 3, pp. 481-482.

67. Stephens, Vol. 3, p. 482-487, 501-502.
68. This evaluation of the the arsenal's post-Korean-War construction program is based on the authors' field survey of the installation and RIA Real Property Inventory. On the creation of the Ordnance Weapons Command, see Clifford W. Stephens, A Synopsis of Events on Rock Island from 1954 Through 1965 (Rock Island Arsenal, 1965), p. 637.
69. "Rock Island Arsenal Annual Unit Historical Report for Fiscal Year 1971," p. 5, unpublished, 1971, microfiche, RIA Historical Office.
70. "Twenty Years of Rocket Launcher Work Reviewed by Rock Island Arsenal," p. 1; Stephens, Synopsis, p. 738. "Rock Island Arsenal Annual Historical Report for Fiscal Year 1967," p. 1, unpublished, 1967, microfiche, RIA Historical Office.
71. See "Rock Island Arsenal Annual Historical Report for Fiscal Year 1968," unpublished, 1968, microfiche, RIA Historical Office.
72. Bouilly, p. 121. In 1969, the post historian noted: "Historically, the Arsenal has been relied upon to produce items which the Army had difficulty procuring economically within required lead times. Consequently, the majority of [the Production] Division's workload consists of small or medium lot production of high priority items with accelerated delivery schedules. Requirements of this type have increased dramatically in recent years. . . ."; "Rock Island Arsenal Annual Historical Report for Fiscal Year 1969," unpublished, 1969, microfiche, p.66, RIA Historical Office. The loss of the tank rebuild program is noted in "Cut Back in Arsenal Work Force Slated," Moline Dispatch, April 18, 1972.
73. Stephens, Synopsis, p. 673; "Rock Island Arsenal Annual Historical Report, 1968," p. 169; "Rock Island Arsenal Annual Unit Historical Report for Fiscal Year 1971," pp. 89-90, 103, unpublished, 1971, microfiche, RIA Historical Office.

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Prepared by: Jeffrey A. Hess
MacDonald and Mack Partnership
February 1985

PROJECT INFORMATION

This project was part of a program initiated through a memorandum of agreement between the National Park Service and the U.S. Department of the Army. Stanley J. Fried, Chief, Real Estate Branch of Headquarters DARCOM, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record, were program directors. Sally Kress Tompkins of HABS/HAER was program manager, and Robie S. Lange of HABS/HAER was project manager. Building Technology Incorporated, Silver Spring, Maryland, under the direction of William A. Brenner, acted as primary contractor, and MacDonald and Mack Partnership, Minneapolis, was a major subcontractor. The project included a survey of historic properties at Rock Island Arsenal, as well as preparation of an historic properties report and HABS/HAER documentation for 38 buildings. The survey, report, and documentation were completed by Jeffrey A. Hess, historian, Minneapolis; Barbara E. Hightower, historian, Minneapolis; David Arbogast, architectural historian, Iowa City, Iowa; and Robert C. Mack, architect, Minneapolis. The photographs were taken by Robert A. Ryan, J Ceronie, and Bruce A. Harms of Dennett, Muessig, Ryan, and Associates, Ltd., Iowa City, Iowa. Drawings were produced by John Palmer Low, Minneapolis.

For further documentation on specific structures at Rock Island Arsenal, see:

Shop B (Building 60)	HAER No. IL-20A
Shop D (Building 62)	HAER No. IL-20B
Shop F (Building 64)	HAER No. IL-20C
Shop H (Building 66)	HAER No. IL-20D
Shop K (Building 68)	HAER No. IL-20E
Shop A (Building 102)	HAER No. IL-20F
Shop C (Building 104)	HAER No. IL-20G
Shop E (Building 106)	HAER No. IL-20H
Shop G (Building 108)	HAER No. IL-20I
Shop I (Building 110)	HAER No. IL-20J
Shop C Boiler House (Building 105)	HAER NO. IL-20K
Storehouse K (Building 56)	HAER No. IL-20L
Reservoir (Building 53)	HAER No. IL-20M

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HAER No. IL-20 (Page 29)

Lumber Shed (Building 138)	HAER No. IL-20N
Magazine (Building 280)	HAER No. IL-20 O
Rock Island Bridge (Government Bridge)	HAER No. IL-20P
B-D Connection (Building 61)	HAER No. IL-20Q
H-K Connection (Building 67)	HAER No. IL-20R
A-C Connection (Building 103)	HAER No. IL-20S
G-I Connection (Building 109)	HAER No. IL-20T
Artillery Ammunition Assembling Plant (Shop L, Building 250)	HAER No. IL-20U
TNT Building (Building 251)	HAER No. IL-20V
Artillery Wheel Stock Dry Kiln (Building 139)	HAER No. IL-20W
Gun Stock Dry Kiln (Building 140)	HAER No. IL-20X
Incinerator Building (Building 133)	HAER No. IL-20Y
Recuperator Building (Shop R, Building 210)	HAER No. IL-20Z
Field and Siege Building (Shop M, Building 220)	HAER No. IL-20AA
Storehouse A (Building 131)	HAER No. IL-20BB
Powerhouse (Hydroelectric Plant, Building 160)	HAER No. IL-20CC
Addendum to Davenport House (Building 346)	HABS No. IL-158
Barracks (AMETA Building, Building 90)	HABS No. IL-1001A
Post Building (Fire Engine and Main Guard House, Building 225)	HABS No. IL-1001B
Headquarters (Quarters 32-33)	HABS No. IL-1001C
Guard House (Building 321)	HABS No. IL-1001D
Commanding Officer's Quarters (Quarters 1)	HABS No. IL-1001E
Subaltern Officer's Quarters (Quarters 2)	HABS No. IL-1001F
Subaltern Officer's Quarters (Quarters 3)	HABS No. IL-1001G
Subaltern Officer's Quarters (Quarters 4)	HABS No. IL-1001H